

Listening and Singing

By Paul Madaule

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The presentation by Dr. Alfred Tomatis, a renowned French ENT specialist, at the 1997 NATS conference in London sparked many singers' interest in the relationship between listening and voice. Further interest in the subject was shown during the 45th NATS Convention, held in Toronto in 1998, with several NATS members visiting The Listening Centre, a clinic that has provided listening training programs based on the work of Tomatis for over 22 years. This was the start of a renewed relationship between work being done at The Listening Centre and work within the field of singing and voice pedagogy. Last summer I again met NATS members interested in the subject of listening at Westminster Choir College's Master Teachers of Voice workshop in Princeton. At the suggestion of Marvin Keenze, I would like to take the opportunity to respond to some of the interest shown regarding the connection between listening and singing. While most of the concepts described here will not be new for many, it is my wish to present them from a different perspective that I think might be of interest.¹



Paul Madaule

Laurie

To begin, I will let Laurie, a singer and Master's student of music, describe her difficulty with singing: I have always wanted to sing, to be a singer. 'There simply must be a missing key, some 'magical' technique,' I thought. "I definitely lack something, most probably (I was ultimately forced to conclude) a great voice... or any voice at all..." Mine seemed less than wonderful. My teachers were never happy. I was rarely cast for shows, my body was extremely tense everywhere (the options were "tight" or "limp"). Vocal "strangling" was a major problem for me. I couldn't understand how singers, especially those with voices I didn't really like (high frequencies bothered me) could feel so good about their singing. For me, singing was a constant guessing game. Every time I triumphantly thought, "Now I'm finally singing correctly!" I was crushed to discover, yet again, how wrong I was, how disappointingly terrible my singing remained: wobbly, overly dark, throaty, the diction mangled, and always, far too much work. I simply could not tell when I approached a more balanced sound production. After all teaching techniques had failed, Laurie's voice teacher suggested that she come to The Listening Centre in Toronto for a sound stimulation program "as a last resort" saying, "take the training or study musicology." I met Laurie to assess her difficulties and reached the conclusion that they were due to a listening dysfunction. I then recommended a listening training program at the Centre.

Jennifer

Jennifer came to The Listening Centre in the fall of 1998. After her first session of listening training (that is 2 hours of sound stimulation for 15 days over 2-3 weeks) she returned home to Seattle and resumed her voice lessons. Shortly thereafter, I received a letter from her voice teacher, Charles Peterson. In his letter he wrote:

We had three lessons after her first session. Noticeable changes are:

1. Posture - She has improved body alignment. Before the first session there was a twist of the upper and lower torso in opposite directions while singing. There has been a remarkable change.
2. Breathing - There is a better and more natural diaphragmatic/abdominal action with better management
3. Range - There is already more ease in production of tone both to upper and lower ranges.
4. Tone Quality - She has a better sense of her “real” singing voice.
5. Speaking - She has had a rather severe glottal stroke at vowel words, a habit that has been difficult to eradicate. The glottal stroke occurs less frequently.
6. Rhythm - Her perception and application are beginning to be easier to understand.
7. ADD diagnosis² - The diagnosis as a severe case has begun to show real improvement Paul Madaule

Voice control for singing, as shown in these two situations, supports the premise Tomatis first described 50 years ago, namely that, “We sing with our ears.” Further research by Dr. Tomatis revealed, “the voice only contains harmonics the ear is likely to hear.” This phenomenon was scientifically verified by Raoul Husson and demonstrated in experiments presented before the Academie Nationale de Medecine and the Academie des Sciences, both in Paris, and became known as “the Tomatis Effect.”³

This was the starting point of a long series of clinical observations and experiments which led Tomatis to re-define our understanding of how the ear works and its influence not only on voice production but also on language development, attention span, communication, written language, and learning skills⁴. I will summarize three of the essential elements of this redefinition of the ear⁵ to shed light on how it affects singing and voice pedagogy⁶.

Hearing, Listening and Self-Listening

While hearing is the passive reception of sound, listening is the active process of tuning in to those sounds we wish to receive while screening out those we do not wish to receive. Listening involves the perception of both external sounds as well as those of our own voice. In the early steps of language acquisition, children receive sound from the surrounding environment (the process of hearing). Then they begin to “pick out”, auditorily speaking, those sounds that are of significance such as “mom, dad, milk, juice” (the process of listening). Children then re-shape these sounds with their own voice modeling them on what they have heard (the process of self-listening). This same process operates in the acquisition of singing, which most children master with ease and grace. For many children, singing is acquired earlier and faster than speech. In my opinion, engaging children in singing is the best listening training one can offer them especially for facilitating their acquisition of language and introduction to the written word and the world of numbers⁷. Simply put, learning to sing also trains our ability to listen to ourselves sing. It involves the fine-tuning and reinforcement of the auditory control of the voice.

You decide to sing. Your brain sends the message of your intention together with the mental sound image of the melody to the parts of the body involved in the vocal process. The air propelled from the lungs through the trachea hits the larynx, whose vocal folds begin to vibrate and produce a sound. From here self-listening begins. Tomatis views audio-vocal control⁸ as a two-step process. In the first step, vibration of the larynx is transmitted via the spine to the bone structure of the body and to the inner ear by bone conduction. The purpose of this first short ear-voice feedback loop⁹ is to alert the brain that a sound, in need of being properly shaped by the vocal tract, is on its way. Bone conducted audio-vocal control gives the singer the kinesthetic awareness – or “feeling” – of his or her voice. It gives the sense of connecting with one’s voice.

At the same time, this triggering of the vibration of the bony shell surrounding the resonating cavities of the head and chest enriches the resonance of the sound. In the second step of the audio-vocal control, the sound travels through the vocal tract out of the mouth and is then picked up by the ear via air conduction. The time lapse between these two steps (bone and air conduction) give the singer the time to adjust the position, tension and shape of the many parts of the body involved in the act of singing¹⁰. It also enables the fine-tuning of the auditory system to control articulation and monitor the various inflexions of the voice in order to maximize the expressive effect. In other words, it is bone conduction that enables the singer to put himself/herself in a self-listening mode¹¹. Bone conduction operates much like a string instrument such as a cello where the vibration of the vocal folds (the cello strings) is transmitted through the bone structure (the body of the cello). From there, the sound vibration generated by the body is transmitted through the surrounding space, making the room an extended resonating cavity that becomes as integral part of the singer's voice. The skill of the singer is to increase the "cello dimension" of voice production and make the most of the room's acoustics to "carry" his or her voice. As a result, the risk of "blowing the voice" excessively in order to fill the space is diminished.

Any deficiency that impairs the precision, clarity and timing of the audio-vocal feedback loop at either one or both levels of control may automatically affect some aspect of voice quality in singing. These deficiencies may cause problems such as difficulty with sound discrimination or a distortion at the threshold levels of auditory perception. In turn, this may induce problems as extreme as singing out of tune (i.e. tone deafness). Milder listening - induced difficulties may be experienced as a reduction of vocal range, loss of control over the intensity of the voice or difficulties with "keeping the beat." In Laurie's case, her weak listening control made her voice "wobbly, overly dark, throaty, the diction mangled" and Laurie found singing to be "a constant guessing game" that required her to constantly overcompensate. Despite all the work Laurie invested in singing, she "simply could not tell when (she) approached a more balanced sound production." Singing was just "far too much work".

Auditory and Body Listening

Tomatis reminds us that the inner ear is made up of both the cochlear and the vestibular systems. The cochlear deals with sound perception including those of our own voice. The vestibular system, better known for giving us a sense of balance, is primarily that which permits us to deal with gravity. Muscle tone, the sense of the body moving in space, and relative body movements (in particular those of the head and neck in relation to the rest of the body) are all related to the vestibular system. The same can be said about posture and breathing control which are so important in singing. A well-established body image and the sense of being "grounded" have a lot to do with the vestibular function. Problems with the vestibular system may affect singers in a variety of ways including with rhythmic delay or being "behind the beat" or "offbeat"; having a voice which lacks "body" or sounds "disconnected"; difficulty coordinating voice expression and corresponding body gestures; stiffness and awkwardness. This is why I like to call the vestibular system the "ear of the body." All singers will agree that the whole body is involved in the act of singing. It is my firm conviction that the "ear of the body" has much to do with it.

Envisioning the concept of the two levels of ear control, that of sound and body, and how they interact, help to explain the list of "noticeable changes" that Jennifer's teacher observed following her listening training session. The expansion of the vocal range and the improvement in quality of both the singing and speaking voice are primarily a result of reinforcing the auditory control via bone conduction.

Changes in posture and body alignment, in breathing, and/or rhythm refer primarily to vestibular control or “body listening”. This also helps to explain Jennifer’s noticeable decrease in her attention deficit disorder¹².

Made by the ear for the ear, music is a true reflection of how the ear works. All music and singing are a composite of rhythm and melody. The rhythmic dimension corresponds to the functioning of the vestibular ear and the melody and lyrics are associated with the cochlear system. Good music and singing require that these two dimensions of the ear work in harmony or, in other words, that they operate as a functional unity. The goal of listening training is to achieve this functional unity to the greatest degree possible.

Listening Training

From my perspective as a practitioner faced day after day with practical problems that require practical solutions, I believe that Tomatis’ greatest legacy is not only to have shown that listening can be trained, and/or retrained, but also to have developed a comprehensive method and technology to do so.

Listening training is not a new idea. The whole field of ear training is well known to all music students. As I mentioned earlier, singing practice is itself listening training. Listening training with the Tomatis Method usually arises as an alternative when traditional voice pedagogy hits a brick wall. Students or professional singers may be faced with a number of problems. These include reaching a plateau; the persistence of “old” or “bad” posture; vocal or breathing habits; the inability of a number of techniques to overcome a darkening of the timbre; range limitations; “wearing out” or “aging” of the voice; or the tendency to overcompensate with technique, thus interfering with the natural flow of the voice. On the other hand, listening training may also be beneficial as an enrichment program for a number of areas including: clarity of timbre; learning and singing song lyrics in a foreign language with flow and ease in pronunciation, as well as with sight reading a score; memorizing music; vocal improvisation; and even easing stage fright. In other words, all singers can benefit from the facilitating and skill-enhancing effects of listening training.

In brief, listening training uses sound stimulation to exercise the ear’s listening function. Tomatis designed an audio device (the Electronic Ear)¹³ composed of a two-channel amplifier, low-pass and high-pass filters and a system of electronic gates that modify and transmit sound information in a random, pulsating way in order to achieve the exercising or training effect.¹⁴ Two sorts of sound sources are used: pre-recorded music, song or chant; and the singer’s own voice which is picked up by a microphone, passed through the Electronic Ear and then to his or her ear through headphones, thereby creating a modified audio-vocal feedback loop. A typical listening program uses pre-recorded music of Mozart, songs, and chants to first develop and reinforce receptive listening. The singer is then led through a series of self-corrective, audio-vocal exercises, including work on posture, to maximize the efficacy of the ear-voice feedback loop¹⁵. Developing good bone conduction is an important part of attaining good audio-vocal control during this stage. This second step is designed to strengthen air conducted audio-vocal control. One key exercise consists of learning to produce, through humming, sounds that emphasize bone conduction. The vibration generated by bone conduction helps the singer to feel his or her body while singing as it produces greater resonance.

The program consists of about 60 hours of listening, on average, although it will vary from individual to individual. This can be done either intensively (two 15 day sessions of listening for 2 hours a day with a

short break of about 1 month in between the two sessions) or non-intensively (1 hour a day for 6 days a week with no interruption).

In addition, listening training can also be done through exercises. In 1987 Tomatis published a book called *L'Oreille et la Voix* in which he gives some audio-vocal exercises for singers. Unfortunately, this document is available only in French. I have also devised some self-help, “earobics exercises” that have proven to be helpful to many musicians and signers. I know of some voice teachers and students who routinely use some earobics as a “warm up” before they begin practicing¹⁶. Listening training is designed to complement the teacher’s work. It is not teaching according to any specific method or technique, nor does it interfere with voice teaching. Rather it prepares the ground, that is, it gets the singer ready for voice work, by connecting and tuning-up the ear, body, and voice, which ultimately makes teaching easier and produces more effective results.

Conclusion

As someone who has spent most of his life in the field of listening training, particularly as it relates to education, I am always interested in how people in other fields, like singing, perceive listening. One of the most useful books I have recently come across is Clifton Ware’s (1998) *Basics of Vocal Pedagogy*¹⁷. Many of the concepts he uses to teach singing resonate with the understanding of listening presented here. For example, Ware discusses the importance of body-mind integration and the concept of flow¹⁸ as necessary for quality voice production. With so much of our philosophy compatible, I was surprised then to see that the role of listening was still understood according to the now classic statement of Giovanni Battista Lamperti: “Do not listen to yourself sing! Feel yourself sing!”¹⁹ Writing about the importance of listening for singing, I feel challenged to respond to this statement for it reveals the common notion associated with listening which, in my opinion, reduces the concept of listening to only the second of this two-step process – that of air-conduction. Approached this way, listening is portrayed as an act that requires a conscious effort on our part, as indicated by commands like “sit still and pay attention” or “be aware of what you are hearing” and what I consider to be a more complete understanding of what listening can be. This is unfortunate, for as teacher and singer Sarah Lopez has noted:

Often beginning singers “listen” to themselves by trying to capture the sound as it leaves their mouths, jaw protruding and lips rounded in thereby heightening the lower tones and muffling the sound. Or they start singing and then change their listening to reproduce the sound that they have just produced as it bounces back to them from the outside acoustics. These are the perspective I think most voice teachers are trying to avoid.

Lopez’s description above is that of listening primarily through air conduction and I agree that it should be avoided. As I have tried to show in this article, listening is primarily a sensory experience that involves both the ear and the body. Listening to oneself sing begins the moment the larynx vibrates and triggers bone conduction. In her teaching practice, Lopez explains, “the bones vibrate first and the air is then applied.” Lopez notes one of the things that listening training does for singers is “to shorten the delay between the thought of the sound and the actual sound being produced. This is the responsiveness and clarity of the bone conduction. The immediate production of resonant sound is a main factor marking the difference between professional and amateur singers.” As I explained earlier, bone conduction prepares the ear and body to be ready for singing. It makes us better listeners of ourselves, giving us the sense of being in control and the sense of feeling of which Lamperti speaks. It is essential for achieving the aspects of singing like flow, body-mind integration, and ease of production that Ware describes so well. Listening is spontaneous and natural and should occur without effort (and the good news is that

if it does not - it can be trained to be so.) As far as I am concerned, if someone tells me that she has to make a conscious effort to pay attention to her voice when singing, this person does not have good listening ability.

Perhaps what Lamperti referred to when he said “Do not listen to yourself sing! Feel yourself sing!” is the need to use the body, that is, bone conduction, in singing.²⁰ In fact it is Lamperti who gives us the best definition of bone conduction in statements like “the more ringing the sound of vibration in the bones of the head and mouth, the better the production of tone”.²¹ Here, Tomatis would probably add a footnote to remind us that both the ear and the skin actually have the same developmental roots: “the skin is an extension of the ear”.²² We have all experienced “the shivers” while listening to music or someone singing, as have all singers when performing. Listening through bone conduction enhances our ability to control our voice through the kinesthetic and tactile nature of the experience.²³

From my clinical practice, I have observed over and over again that listening and feeling are not two separate experiences. Rather listening is feeling. From this re-framing of the concept of listening, I would re-formulate Lamperti’s maxim as “Feel, in order to listen to yourself sing! If the internal conditions are right and ready, the singing voice appears!” And if any doubt remains, I would let Laurie and Jennifer describe in their own words the power that listening has in singing. After having completed 60 hours of listening training, Laurie described her experience to me in an email in this way:

I continue to gain better hearing sensations and new awareness of my voice, which has grown in size, range, ease of production, and, in particular, the joy and expressive freedom so vital for healthy singing and artistic communication. As singing grows easier, the voice grows more beautiful, the simple out-pouring of my own emotions along the curve of a composer’s phrase. The intense frustration is gone. I no longer retain great amounts of tension in my body, and I am much more relaxed with myself and with others.²⁴

And Jennifer just wrote me to continue to update me on her progress, one year later, to say: Wow, it has made a huge difference! I have such a profoundly improved kinesthetic awareness of my body, which is a key factor in producing a pure, free and natural sound. I have always had a natural instrument; however, there was something disconnected keeping me from finding my True Voice. I believe that my therapy at The Listening Centre unlocked the door that has sent me on the way to truly finding the voice God gave me!

Endnotes

1. The author wishes to thank and acknowledge the input of the following people in the writing of this article: Marvin Keenze, Dr. Sarah Lopez, Devika Eifert, and Kim Rygiel.
2. Attention Deficit Disorder. See footnote 11 for more information.
3. M.R. Husson and M. Moulouquet. “Modifications Phonatoires d’Origine Auditive et Applications Physiologiques,” *Bulletin de l’Academie Nationale de Medicine*. V2 141 (1957) pg. 19-20.
4. For more information on Tomatis’ work see Tomatis, Alfred A. *The Ear and Language* (Norval, Moulin Publishing, 1996); *The Conscious Ear* (Barrytown:Station Hill Press, 1991); and in French, *L’Oreille et La Voix* (Paris: Robert LaFont,1987); *La Nuit Uterine* (Paris: Editions Stock, 1981); and *Vers l’Ecoute Humaine* (Paris: Les Editions ESF, 1974) vol.1&2.

5. For clarification, it should be noted that when I write about the ear I am referring to the peripheral organ together with all of its neural connections with the nervous system and body.
6. For work on the Tomatis Method as it applies to singers see Lander, John. "What Role Does the Ear Play in Singing" *Australian Voice* (1996:57-65); Madaule, P. "The Tomatis Method for Singers and Musicians" in *About the Tomatis Method* eds. T. Gilmore, P. Madaule and B. Thompson (Toronto: The Listening Centre Press, 1989); Tomatis, Alfred.A. "L'Oreille Musicale" *Journal Francais O.R.L.* 1 Juillet, 1953; "La Voix", *Revue Musicale, Edition Speciale*, 1962.
7. I am a strong supporter of early childhood music education. For more on this subject see Madaule, Paul. "Listening Training and Music Education" in *Early Childhood Connections* Spring, (1998:34-41) and "Music: an Invitation to Listening, Language, and Learning" in *Early Childhood Connections* Spring (1997: 30-34).
8. I use the term audio-vocal control, from the French *controle audio-vocal*, interchangeably with ear-voice feedback loop.
9. The transmission of sound through solid (bone) is faster (shorter) than through air.
10. Tomatis identifies and describes no less than 11 ear-brain-vocal tract and body loops of control involved in singing (*L'Oreille et La Voix*, *Ibid* p. 157-181)
11. In *When Listening Comes Alive*, I refer to this two-step process of audio-vocal control as "voicening" (*Ibid*, p.165-178).
12. While A.D.D. is not the subject of this article, in short, we view many cases of A.D.D. as listening-related difficulties. Some types of hyperactivity, that we prefer to call "hyperreactivity", are, in our opinion, the result of poorly established "body listening". For more on this see *When Listening Comes Alive*, *Ibid*, p117-121.
13. The team at The Listening Centre has recently developed a portable, user-friendly listening training device called the LiFT (Listening Fitness Trainer) as an alternative means to provide sound stimulation programs. It is our intention to soon offer a Listening Fitness course to teach voice teachers how to use the LiFT and include listening training in their voice studio. For more information visit the listening fitness web site at <http://www.listeningfitness.com>
14. The gate works on receptive listening by widening the range of overtones heard. The sound plays through the first channel unmodified, that is, as the ear would normally hear the sound. It then plays the same sound but in a modified way so that the ear hears the sound but with a wider range of overtones. The overall effect is to broaden the spectrum of sounds the ear hears.
15. As with receptive listening, the gate has 2 sound channels, one which reproduces the way the singer sings in a non-corrected mode sending back sound to the ear as it is – that is unchanged –and a second channel which sends the voice back modified by enriching the overtones.
16. See Madaule, P. *When Listening Comes Alive* (Norval: Moulin Publishing, 1994) p155-184
17. Ware, Clifton. *Basics of Vocal Pedagogy: The Foundations and Process of Singing* (Boston: McGraw-Hill, 1998).
18. This concept is developed and explained in the work of Mihaly Csikszentmihaly. See for example, *Flow: The Psychology of Optimal Experience* (New York: Harper Row, 1990).

19. See Brown, William Earl. *Vocal Wisdom: Maxims of Giovanni Battista Lamperti* (Boston: Crescendo Publishing, 1973) p. 16 and in Ware, *Ibid*, p. 19
20. I wish to thank Dr. Sarah Lopez for her insights here based on discussions and correspondence at the time of writing this article. Sarah's insight comes from the unique perspective of a teacher of singing who uses listening training in her voice studio.
21. (*Ibid* 19,40.)
22. By this Tomatis refers to the fact that the embryo consists of 3 layers, which will later become the human body. They are the endoderm, the mesoderm and the ectoderm. The ectoderm will develop into the skin, the ear and the nervous system. The fact that the nervous system stems from the same origin as the ear and the skin is a subject for further meditation when thinking about the meaning and role of music in human development.
23. This is what Ware means when he says, "In the final analysis, singing is based on tactile experience."
24. For Laurie's complete testimonial visit The Listening Centre web site at <http://www.listeningcentre.com>. For Jennifer's complete testimonial, visit the testimonial section of the same website.

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